Amendments to the Drawings:

The attached sheet of drawings includes changes to Figure 4. This sheet, which includes Figs. 3 and 4, replaces the original sheet including Figs. 3-4.

Attachment: Replacement Sheet
Annotated Sheet

REMARKS

In the Office Action dated August 14, 2006, claims 1-70 were examined with the result that all claims were rejected. The Examiner also objected to the specification and drawings. In response, applicant submits a "Replacement Sheet" as well as an "Annotated Sheet" to correct Figure 4, as requested by the Examiner, and has submitted a new set of claims 71-103 herein. In view of the above amendments and following remarks, reconsideration of this application is requested.

1. Drawings

The Examiner objected to Figure 4, as filed, because it lacked proper cross hatching to indicate various types of materials. More specifically, the cross hatching to indicate the conductive and the insulation materials was deemed improper.

Accordingly, applicant submits a replacement sheet containing Figures 3 and 4 which corrects Figure 4 to provide proper cross hatching of materials. Applicant also includes a marked up copy of the enclosed replacement sheet labeled as an "Annotated Sheet" that explains the changes made to Figure 4.

2. Specification

In the Office Action, the Examiner objected to the Abstract of the Disclosure because it utilized the term "comprises" in line 1 thereof. Applicant has replaced this term with the word "having" as requested by the Examiner.

In addition, the Examiner objected to the Abstract in line 7 which contained the misspelled word "insulting". Applicant has corrected the spelling to denote that the correct word is actually "insulating".

In view of the above corrections, applicant requests the Examiner withdraw the objection to the specification.

3. Claim Amendment and Basis

The claims have been amended to more clearly define the features considered by the Applicant to distinguish the invention. As the new claims are a significant revision,

Applicant has not marked up the original claims, but has cancelled original claims 1-70, and in what is discussed below, provided a basis for new claims 71-103.

New independent claims 71, 79, 85 and 94 require that each of the electrically insulating layer (protective layer in claim 94) and additional heat transformable layer comprise a polymer base composition comprising at least 50% by weight of the polymer base composition of an organic non-silicone polymer. There is an explicit basis for organic non-silicone polymers for the insulating layer on page 3, lines 21-22 and for the at least one other heat transformable layer on page 6, lines 23-25.

The Examiner will also note that the organic polymer content of each base composition is also described on page 9, lines 29-30.

3.a. Non-Silicone

It is important for the Examiner to note that the term organic polymer was used in the claims as filed to refer to non-silicone polymers. Page 8, lines 10-14 states:

> "An organic polymer is one which has an organic polymer as the main chain of the polymer. For example, silicone polymers are not considered to be organic polymers . . ."

Silicones may contain carbon-containing groups in the side chains (for example, methyl in the case of polydimethylsiloxane), but do not contain repeating carbon groups in the main chain. To make this abundantly clear, the proposed claims refer explicitly to "organic non-silicone polymer" (emphasis added).

3.b Insulating Layer

The insulating layer (protective layer in claim 94) contains a silicate mineral filler. This is referred to on page 10, lines 17-24.

3.c. Heat Transformable Layer

The one or more heat transformable layers contain an inorganic filler which is preferably a mineral silicate and inorganic phosphate. There is a basis for this on page 6, lines 22-24. The option of using an inorganic filler which is selected from a metal oxide, metal hydroxide, talc and clay is disclosed on page 15.

3. d. Subsidiary Claims

Claims 72, 80 and 86 relate to the preferred ceramic forming material which is disclosed at page 4, lines 2-7 with explicit reference to International Application PCT/AU2003/01383. Enclosed herewith is a copy of this PCT application which has been published as International Publication No. WO 2004/035711 and US Publication 2006/0068201. Page 4, lines 5-7 explains that the relevant aspect of this application (incorporated by reference) "describes a composition which contains an organic polymer, a silicate mineral filler and a fluxing agent or precursor resulting in a fluxing agent in an amount of from 1-15 wt% of the resulting residue". Claims 72, 80 and 86 define the source of fluxing oxide in accordance with the disclosure of the referenced publication. In particular, the Examiner is referred to the disclosure at page 16, lines 18-27, and page 19, lines 7-24 of WO 2004/35711. There is a basis for the residue constituting at least 40% of the total composition on page 20, lines 24-26 of WO 2004/35711. There is also a clear bases for claim 93 in WO 2004/35711 in claim 10.

Claims 73, 74, 81, 89 and 90 claim a preference for the insulating layer (claim 73) and other heat transformable layer (claim 74) being free of silicone polymer. This option is disclosed on page 3, line 21 "The ceramic forming composition may be non-silicone polymer based".

There is a basis for claim 75 at page 6, lines 22-24 and a basis for claims 76 and 78 on page 7, lines 24-32.

3.e. Claim 79

Claim 79 relates to an embodiment in which the heat transformable layer contains "one or more materials which form a molten glass at elevated temperature". There is an explicit and general basis for this embodiment at page 16, line 25 to page 22, line 18. Page 16, line 30 states "It has also been found that the glaze formed after exposure to elevated temperatures may enhance the structural integrity and strength of the ceramic layer formed". See also the paragraphs bridging page 18 and 19. The preference for the heat transformable layer being over and in contact with the insulating layer is explained on page 16, lines 29-30.

3.f. Claim 85

Claim 85 relates to the embodiment in which the heat transformable layer is a sacrificial layer. This embodiment is disclosed on page 12, lines 12-17.

3.g. Claim 94

Claim 94 relates to a fire performance article and is based on original claim 43.

4. Claim Rejections

The new claims 71-103 call for a polymer base composition comprising at least 50% by weight of organic (non-silicone) polymer. The silicone polymers used by Kasahara are quite different from the organic polymers used in the present invention as the Kasahara silicones have a backbone of silicon-oxygen linkages in the main chain. This main chain is not organic as it does not contain carbon.

As explained on page 4 of the translation, the Kasahara cable has a double rubber layer formed of silicone rubber filled with mica powder and containing a flame retardant. Kasahara recognizes that two layers of silicone rubber may be used over a conductor with additional electrically insulating polyolefin layers (see page 6, paragraphs 20 and 21 of the translation). However, Kasahara does not teach or suggest organic polymer (i.e. non-silicone) layers filled with inorganic components.

As shown in the Kasahara drawing, the layer 5 is a synthetic resin over a dual silicone rubber layer.

The difference between a carbon backbone and a silicon oxygen backbone gives rise to a significant difference in properties between organic backbone polymers such as polyolefins and silicone polymers. This significant different is recognized in standard texts such as the attached extract from the Encyclopedia of Polymer Science and Engineering which states on page 1049 "The silicon-oxygen chain that constitutes the chain of these (silicone) polymers is predominantly responsible for their uniqueness".

It should also be noted by the Examiner that the present application explicitly teaches the disadvantage of using a polymer base which is predominantly a silicone. Page 9, line 29 to page 10, line 9 explain the significant advantage in processing cables of the present invention which stem from restricting the presence of silicone polymers.

> The organic polymer is present in the polymer base composition of the relevant layers of the cable claimed in claim 1 in an amount of at least 50% by weight. This facilitates loading of the polymer base composition with the additional components without detriment to the processability of the overall composition. As noted the polymer base composition may include silicone polymer. However, in this case the organic polymer would usually be present in the polymer base composition in a significant excess when compared with the silicone polymer. Thus, in the polymer base composition the weight ratio of organic polymer to silicone polymer may be from 5:1 to 2:1, for instances from 4:1 to 3:1. In terms of weight percentage, if present, the silicone polymer might generally be presented in an amount of from 2 to 15% by weight based on the total weight of the formulated fire resistant composition. When a combination of organic and silicone polymers are used, high concentrations of silicone polymer can present processing problems and this should be taken into account when formulating compositions in accordance with the present invention.

Clearly, Kasahara teaches away from compositions which contain relatively minor proportions of silicone. Indeed, Kasahara does not recognize use of polymers other than silicones in the heat resistant layers and there is no need to include inorganic fillers in the electrically insulating layers (e.g. 5) of Kasahara as Kasahara teaches the silicone heat resistant layers.

The Examiner considers original claims 6-11, 23, 30-35, 41, 47-52 and 65-67 to be obvious over Kasahara in view of von Bonin. Von Bonin is not concerned with cable layers, but merely filling gaps or sealing penetrations in buildings through which cables or plumbing may pass.

Von Bonin US 4,992,481 relates to fire retarding elements used as sealants which are installed in a moist state and impermeable to gas after drying. The von Bonin patent relates to a liquid impregnation composition. Such compositions would be not useful in contact with conductive elements due to their conductivity. Von Bonin uses the liquid impregnation compositions to insulate a multilayer cable from a fire (see Example 4), but does not teach it as part of the cable construction. Indeed, the von Bonin composition is intumescent and designed to rapidly expand so as to fill spaces such as ducts and building service penetrations for plumbing conduit and electrical cable conduit.

Von Bonin thus does not address the need to obtain a combination of electrical insulation for operation of cables and both electrical and high heat insulation to retain the function of the cable under fire conditions. Von Bonin is concerned with sealants rather than cable sheaths or layers. Indeed, von Bonin does not propose the composition as part of a cable, but merely addresses fire barriers for cable ducts and penetrations in building structures for cable transmissions. Thus, if the teaching of von Bonin were followed in application to cables, it would merely result in use of the liquid impregnation about the outer electrical insulation layer of a cable.

In applicant's view, it is not appropriate to combine von Bonin and Kasahara so as to modify the cable construction of Kasahara. However, even if von Bonin and Kasahara are combined they merely together teach that the von Bonin liquid impregnation could be used as a further insulation about the Kasahara type cable to form a seal, plug in a gap or penetration within a building to stop fire spread (see Example 8 and 10). There would be no reason to replace or substitute other materials for the silicones of Kasahara as Kasahara calls for the unique properties of silicones in addressing the provision of fire resistance.

Accordingly, neither Kasahara or von Bonin or any reasonable combination would teach or suggest the invention claimed in the present application.

An effort has been made to place this application in condition for allowance and such action is earnestly requested.

Respectfully submitted,

ANDRUS, SCEALES, STARKE & SAWALL, LLP

Thomas M. Wozny
Reg. No. 28,922
Andrus, Sceales, Starke & Sawall, LLP
100 East Wisconsin Avenue, Suite 1100
Milwaukee, WI 53202
(414) 271-7590
Attorney Docket No.: 322-00093

CABLE AND ARTICLE DESIGN FOR FIRE PERFORMANCE

ABSTRACT

A cable (1) ~~comprises~~ having a conductor (3), an insulating layer (2) which forms a self-supporting ceramic layer when exposed to elevated temperatures experienced in a fire, and an additional heat transformable layer (4). The additional layer (4) can be another layer which forms a self-supporting ceramic layer when exposed to fire, or it can act as a sacrificial layer which decomposes at or below the temperature that the insulating layer forms a ceramic. The additional layer can enhance the strength of the layers before, during or after the fire, the structural integrity of the ~~insulting~~ insulating layer (2) after the fire, the resistance of the layers to the ingress of water after the fire, or the electrical or thermal resistance of the layers during and after the fire.

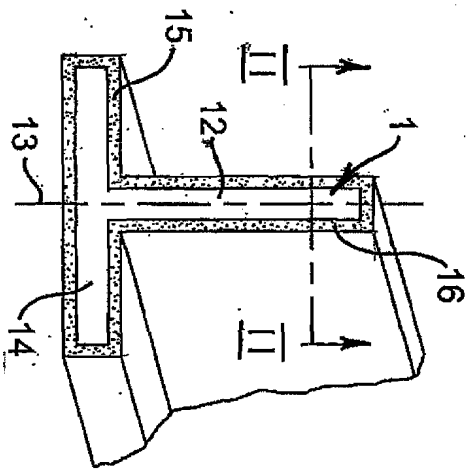

FIG 3

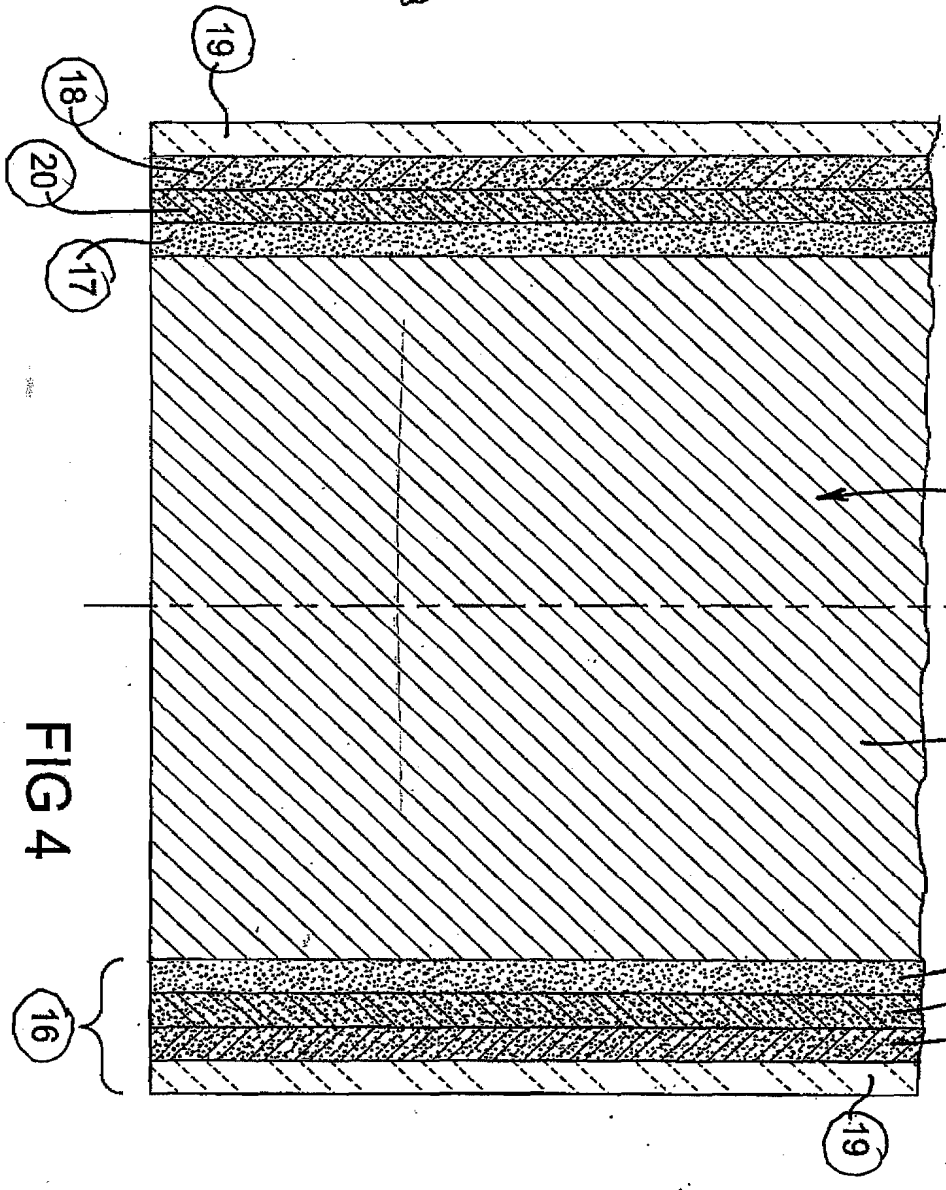

FIG 4

Connected Cross Hatching for metal substrate 12 and individual layers of protective coating 16